MOTORCYCLE STAND

FIELD OF THE INVENTION

The present invention generally relates to the field of mechanical stands and, more particularly, to an improved motorcycle stand that is foot driven, easy to use, self-lubricating, adjustable to accommodate different sizes of motorcycle frames, stronger, and less costly to manufacture than that of the prior art.

BACKGROUND OF THE INVENTION

When motocross racing, it often desirable to stand a dirt bike upright between races so that the engine and various other motorcycle parts are not inadvertently damaged. Dirt bikes, however, are not typically equipped with integral standing mechanisms, known as kick stands, for several reasons. First, they pose a risk of becoming inadvertently deployed during a race, which could cause injury to the rider or others. Second, kick stands are typically ineffective at keeping the bike stable because the ground surface surrounding dirt tracks is often too unstable to support the weight of the bike using such a stand. As a result, free-standing devices of varying shapes and sizes have been developed to support motocross bikes between races.

Stands are known, which support the frame of a motocross bike using one or two telescoping, tubular columns that are elevated by a foot driven lever. Due to the telescoping nature of the columns, a lubricant typically needs to be regularly applied to the telescoping column. The lubricant, however, generally attracts dirt and other miscellaneous particles that

are commonly airborne at a dirt track. Thus, the columns must be consistently cleaned and lubricant replaced, or the columns become riddled with dirt, thereby causing them to malfunction. Thus, there is a need for a self-lubricating, maintenance-free, column-type stand, which does not attract dirt and other miscellaneous matter, yet provides ample lubrication for the telescoping column(s) of a motorcycle stand.

Another problem exists with stands known in the art. In order to be commercially viable, a stand must be able to accommodate varying sized dirt bikes. Stands exist, like that disclosed by Mitchell in U.S. Patent No. 4,420,164, which utilize a pin and hole arrangement for varying the height of the tubular support columns. (To obtain a complete understanding of the Mitchell Patent, reference should be made directly thereto.) Such devices can only be adjusted to specific heights as dictated by the spacing of the holes in each column.

Similarly, stands are known, which employ telescoping support columns that are actuated by a lever, but are limited to a specific range of elevation heights (i.e., the elevation height in the rest position and the height in an elevated position). As can be appreciated, these devices do not allow for fine tuning the height of the columns to accommodate irregularly sized frames. Riders are not given ample choice to adjust the stand to the height of their particular bikes. Short and tall riders are equally disadvantaged by this arrangement. Both types of riders must use the predetermined heights as dictated by the spacing of the holes or the fixed interconnection between the lever and the support column. As a result, the lowest setting of the stand may be too high to fit under the frame of a shorter rider's bike, making the stand useless. Similarly, the highest setting might not be able to adequately lift a taller frame off of the ground. Thus, there is a need for a stand, which has the ability to be

adjusted to an infinite number of heights within a specified range in order to accommodate a greater number of motorcycle frames.

A final identified problem exists with foot-driven dirt bike stands. Most stands are made out of a light-weight material, such as aluminum, and use weldments to interconnect the actuating lever to the stand. As a result, the stands must be heat treated (i.e. annealed) several times before use in order to strengthen the weldments to the point where they can sustain the repeated force of the actuating lever, which is a costly process. Thus, a low-cost alternative to weldments, which offers equivalent or greater tensile strength, is desired in order to minimize overall manufacturing costs of the stand, while improving durability.

SUMMARY OF THE INVENTION

The present invention is designed to overcome the aforementioned problems and meet the aforementioned, and other, needs. In one embodiment of the present invention, a stand, adapted for use with a motorcycle, is provided, comprising:

(a) a base;

(b) a self-lubricating support member in contact with the base;

(c) a support sleeve having at least a top surface and in slidable telescopic contact with the self-lubricating support member;

(d) a lift platform associated with the top surface of the support sleeve;

(e) an actuating lever in operable communication with the support sleeve;

(f) at least one link member which is pivotally connected with the actuating lever and the base; and

wherein, the lift platform can be selectively positioned between a first position of rest and a second position of use.

It is thus one aspect of the present invention to provide an improved motorcycle stand that is self-lubricating and maintenance free. In one embodiment, the stand is comprised of a telescoping support member, which incorporates a self-lubricating material, such as DELRIN plastic.

Another aspect of this invention is to provide an infinitely adjustable stand to better accommodate varying sizes of motorcycle frames. In one embodiment, the stand consists of a coupling mechanism that allows the user to adjust the elevation height of the stand.

It is yet a further aspect of this invention to provide a stronger stand that costs less to manufacture than conventional stands. This advantage is achieved by replacing the weldments previously used to interconnect various components. In one embodiment, the actuating lever of the stand is interconnected to the stand via a removable clevis and a coupling mechanism. Other similar mechanisms to achieve the same advantage could equally be utilized. By using these mechanisms, a greater overall tensile strength can be attained for the lever/stand interconnections without the need for additional heat treatments, thereby lowering the overall cost of the device.

The present invention offers an improvement to motocross bike stands by providing a stronger, more adjustable, and self-lubricating device. Now, motocross riders can use a maintenance free, more durable, single stand to accommodate various sizes of motorcycles at a dirt track.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is an exploded perspective view of one embodiment of the motorcycle stand;

Fig. 2A is a side isometric perspective view of one embodiment of a base of the motorcycle stand;

Fig. 2B is a side isometric perspective view of another embodiment of the base of the motorcycle stand;

Fig. 2C is a side isometric perspective view of yet another embodiment of the base of the motorcycle stand;

Fig. 3 is an exploded perspective view of another embodiment of the motorcycle stand;

Fig. 3A is a side isometric perspective view of one embodiment of the base of the motorcycle stand in which self-lubricating strips engage the support member of the base;

Fig. 3B is a top perspective view of the base shown in Fig. 3A;

Fig. 3C is a bottom perspective view of one embodiment of the lift platform of the motorcycle stand in which self-lubricating strips engage to the support sleeve;

Fig. 3D is a side isometric perspective view depicting one embodiment of a self-lubricating sleeve adapted for use with the support column of the motorcycle stand;

Fig. 4A is a side isometric perspective view of one embodiment of the lift platform of the motorcycle stand;

Fig. 4B is a side isometric perspective view of an alternative embodiment of the lift platform;

Fig. 5 is a side isometric perspective view of one embodiment of the motorcycle stand shown in a first position of rest;

Fig. 6 is a side isometric perspective view of the stand of Fig. 5 in a second position of use;

Fig. 7A is a side perspective view of one embodiment of the actuating lever shown in a first position of rest; and

Fig. 7B is a side perspective view of the actuating lever of Fig. 7A shown in a second position of use.

The following components and numbers associated thereto are shown in the drawings and provided here for ease of reference:

#	Component	#	Component
2	Stand	34	Bottom surface of support sleeve
4	Base	36	Tactile pad
6	Leg	37	Elbow
8	Support member	38	First half of coupling mechanism
10	Support sleeve	40	Second half of coupling mechanism
12	Lift platform		
14	Actuating lever	42	First link member
16	First end of actuating lever	44	Second link member
18	Coupling mechanism	46	First end of first link member
20	Linkage assembly	48	Second end of first link member
22	Pedal	50	First end of second link member
24	Second end of actuating lever	52	Second end of second link member
26	Clevis		
28	Self-lubricating sleeve	54	First half of clevis
29	Strip	56	Second half of clevis
30	Aperture	58	Bolt
32	Top surface of support sleeve	60	Spring

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

While this invention is susceptible of embodiments in many different forms, there are, as shown in the drawings and will herein be described in detail, currently understood preferred embodiments of the invention. The reader is to understand that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspects of the invention to the embodiments illustrated.

The present invention recognizes the limited nature of motorcycle stands, which are not infinitely adjustable, prone to malfunction due to dirt track conditions, and are costly to manufacture. Thus, the present invention presents an improvement to motorcycle stands.

Referring now to the drawings, **Fig. 1** depicts an exploded perspective view of one embodiment of the present invention. In general, the stand 2 is comprised of a base 4 with at least one leg 6. A support member 8 is interconnected to the base 4 and cooperates in a telescopic fashion with a support sleeve 10. The support sleeve 10 is interconnected to a lift platform 12. An actuating lever 14, adapted for providing the force to elevate the support sleeve 10 and lift platform 12, is moveably interconnected to the stand 2. The actuating lever 14 has a first end 16, which is interconnected to the support sleeve 10 via a coupling mechanism 18. The actuating lever 14 is also interconnected to the base 4 via a linkage assembly 20. A pedal 22 is interconnected to a second end of the actuating lever 24, which is adapted for foot driven use. The linkage assembly 20 is removably interconnected to the base 4 via a clevis 26.

The stand 2 is generally comprised of rigid non-brittle materials, which are durable and not likely to wear, deflect, or break during continual use. The stand 2 is preferably, substantially, comprised of metal, metallic alloy (e.g., stainless steel, carbon steel, titanium, or aluminum), or a combination thereof. Of course, other metals commonly known in the art, as well as plastics, fiberglass, and other materials, which have similar properties to metal and metallic alloys, can also be used.

As shown in **Figs. 2A**, **2B**, and **2C**, the base 4 is generally further comprised of at least one leg 6 to stabilize the support member 8. A single leg 6, as shown in **Fig. 2C**, provides the most stable base 4, but is also the most costly. As more legs 6 are added (e.g., four legs shown in **Fig. 2B**), the stability increases, but the overall weight and cost also increase. Thus, it is preferable to use three legs 6 to support the base 4, as shown in **Fig. 2A**, because it is the cheapest, lightweight, stable embodiment that can be used. However, if a single leg 6 is used, as shown in **Fig. 2C**, the perimeter shape of the leg 6 can be circular, oval, polygonal, asymmetrical, etc. As can be appreciated by one skilled in the art, the base 4 can be made in a one-piece unit comprised of at least one leg 6 and the support member 8 or a two piece configuration with at least one leg 6 interconnected to the support member 8.

An important aspect of the present invention is to provide a support member 8 and a support sleeve 10, which cooperate in a self-lubricating, telescopic manner. Use of a self-lubricating material eliminates the need for lubrication of these parts and thus reduces the amount of dirt, and other particulates that are attracted to and can damage the mechanism. A person of ordinary skill in the art will appreciate that self-lubrication can be achieved either by using a self-lubricating support member 8 or a self-lubricating support sleeve 10.

It is also possible that both the support member 8 and support sleeve 10 include self-lubricating material in order to facilitate the telescopic interconnection. In one embodiment, the support member 8, in and of itself, is made out of a self-lubricating material, such as DELRIN plastic or another material having similar self-lubricating properties. Alternatively, the support member 8 engages a self-lubricating member made out of a similar self-lubricating material. The self-lubricating member can be made in various embodiments. For example, as shown in **Fig. 3**, in one embodiment, the self-lubricating member is a self-lubricating sleeve 28, which has an aperture 30 that spans a height of the self-lubricating sleeve 28 and is centrally positioned. Alternatively, the self-lubricating sleeve 28 can be made in strips 29 which engage either the support member 8 or the support sleeve 10 (see **Figs. 3A, 3B, and 3C**). As one ordinarily skilled in the art can appreciate, the strips 29 can also be interconnected to each other and then engaged with the support member 8 or the support sleeve 10. Regardless, the advantage to using a self-lubricating sleeve 28 is that it can be replaced, if necessary.

In yet a further embodiment, a hollow sleeve of self-lubricating material, as described above, can be inserted into the support sleeve 10. See **Fig. 3D**. In this configuration, the support member 8 engages and telescopes in and out of the self-lubricating sleeve 28, which is housed in the support sleeve 10. Again, while not necessary to the invention, it is preferable that the self-lubricating sleeve 28 be interchangeable.

The support member 8 can be made in a variety of shapes and sizes. While it is preferable that the support member 8 be made in a cylindrical shape, as shown in **Figs. 1** and **3**, the support member 8 can be made in a polygonal shape (e.g., rectangular, hexagonal,

etc.). It is important to maintain a tight seal between the support member 8 and the support sleeve 10, or the self-lubricating sleeve 28 and the support sleeve 10 so that miscellaneous particles (e.g., dirt) do not become lodged between the two respective components and cause the stand 2 to malfunction. Thus, in order to minimize any gaps that might exist, the support sleeve 10 should be made with the same or a very similar outer surface shape as the support member 8. A dirt/dust seal member may also be used on the support sleeve 10 to further minimize unwanted gaps.

In addition, the support member 8 can be interconnected to the base 4 in a variety of manners. For example, it can be secured via bolts. Alternatively, weldments could be used. As one skilled in the art can appreciate, other manners of securing the support member 8 to the base 4 are also within the scope of the invention.

Regardless of its shape, the diameter of the support member 8 also can vary depending on the embodiment. As shown in **Fig. 1**, the diameter of the support member 8 is preferably slightly smaller than that of the support sleeve 10 so that support member 8 can easily telescope in and out of the support sleeve 10. In the alternative embodiment described above which involves the use of the self-lubricating sleeve 28, the diameter of the support member 8 is preferably smaller than the aperture 30 of the self-lubricating sleeve 28 so that the self-lubricating sleeve 28 snugly fits over the support member 8, and remains interconnected to the support member 8 while it telescopes in and out of the support sleeve 10. See **Fig. 3**.

Referring now to **Fig. 4A**, the support sleeve 10 has a top surface 32 and a bottom surface 34. A lift platform 12, adapted to support the frame of the motorcycle, is

interconnected to the top surface of the support sleeve 32. Like the base 4, the lift platform 12 and support sleeve 10 can be fastened together or can be machined in a one-piece construction. Regardless, it is preferable that the lift platform 12 is further comprised of a tactile pad 36, which provides a means for gripping the frame of the motorcycle to prevent slippage. As shown in **Figs. 4A** and **4B**, the lift platform 12 and the accompanying tactile pad 36 can be made in various shapes and sizes. A rectangular shape is preferable because it best distributes the weight of the motorcycle frame with the least amount of material. Of course, a lift platform 12 without a tactile pad 36 or of virtually any shape, size, or configuration is also within the scope of the present invention.

Referring back to **Fig. 1**, the actuating lever 14 is preferably angular in shape (i.e., has an elbow 37) so that greater leverage and a locking position can be achieved, as more fully discussed below. As previously noted, the first end of the actuating lever 16 is interconnected to the coupling mechanism 18 and the second end of the actuating lever 24 is interconnected to a pedal 22. As can be appreciated by one skilled in the art, the actuating lever 14 is just one embodiment of a means for elevating the support member and the lift platform. In addition, the pedal 22 can be made in various shapes (e.g., circular, asymmetrical, rectangular, or other polygonal shape). In a preferred embodiment, as shown in **Fig. 1**, the pedal 22 is further comprised of grooves or protrusions on an upper surface of the pedal 22 in order to facilitate a user's traction. Of course, a pedal 22 that has a smooth surface is also within the spirit and scope of the present invention.

As shown in **Figs. 1** and **2**, the coupling mechanism 18 is further comprised of a first half 38 and a second half 40, which interconnect the actuating lever 14 to any point along the

support sleeve 10. This configuration offers the user the ability to adjust the starting and overall elevation heights of the lift platform 12 by varying the point at which the coupling mechanism 18 interconnects to the support sleeve 10. Accordingly, various sized frames can be accommodated with a simple adjustment.

The actuating lever 14 pivots through the use of an interconnected linkage assembly 20. As shown in **Fig. 5**, in one embodiment, the linkage assembly 20 is further comprised of a first link member 42 and a second link member 44, each having a first and a second end 46, 48, 50, 52, respectively. The first end of the first link member 46 is rotatably interconnected to the actuating lever 14 between the first end 16 and second end 24. The second end of the first link member 48 is rotatably interconnected to the clevis 26, which is fastened to the leg 6 of the base 4. A first end and a second end of the second link members 50, 52 are rotatably interconnected to the actuating lever 14 and clevis 26 in a similar manner. As one skilled in the art can appreciate, the linkage assembly 20 could be comprised of a single link member. However, the use of the first and second link members 42, 44, as described above, ensures that actuating lever 14 will not become disconnected from the linkage assembly when a heavy load is applied to the actuating lever 14.

Referring back to **Figs. 1** and **3**, the clevis 26 is shown in greater detail. In one embodiment, the clevis 26 is further comprised of a first half 54 and a second half 56. The first half 54 is rotatably interconnected to the second end of the first link member 48 and is also interconnected to the leg 6 of the base 4 via at least one bolt 58. Similarly, the second half 56 is rotatably interconnected to the second end of the second link member 52 and is also interconnected to the leg 6 of the base 4 via at least one bolt 58. This configuration

offers a stronger tensile strength than weldments, which are typically used to fasten the first and second halves of the clevis 54, 56 to the base 4. Thus, the overall cost of the stand 2 is lowered because the need to anneal the weldment is eliminated. A similar result is also achieved by interconnecting the coupling mechanism 18, as described above, to the support sleeve 10 instead of using weldments.

Referring now to **Figs. 5** and **6**, one embodiment of the present invention is illustrated in a first position of rest and a second position of use, respectively. In order to operate the stand 2, an operator manually depresses the pedal 22 of the actuating lever 14 with his foot, which causes the support sleeve 10 and the respective lift platform12 to extend upward. The actuating lever 14 locks into position when the pedal 22 hits the ground and the elbow 37 of the actuating lever 14 has traveled past the linkage assembly 20. See **Fig. 6**. As a result, the lift platform 12 and support sleeve 10 are fully extended, thereby supporting the weight of the motorcycle as it is balanced above the ground.

In order to aid the user in depressing the pedal 22, an alternative embodiment of the invention is further comprised of a spring 60 that is interconnected to the actuating lever 14 and the leg 6 of the base 4. As shown in **Fig. 7A**, the spring 60 is fully extended when the stand 2 is in the first position of rest. Conversely, when the stand 2 is in the second position of use, as shown in **Fig. 7B**, the spring is recoils to its original state, thereby providing additional downward force to the actuating lever 14. Once fully recoiled, the spring 60 also aids with keeping the actuating lever 14 in a locked position.

While an effort has been made to describe some alternatives to the preferred embodiment, other alternatives will readily come to mind to those skilled in the art.

Therefore, it should be understood that the invention may be embodied in other specific forms without departing from the spirit or central characteristics thereof. The present examples and embodiments, therefore, are to be considered in all respects as illustrative and not restrictive, and the invention is not intended to be limited to the details given herein.